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ABSTRACT

An ethnographic case study was conducted over a 2-year period to assess stability and change in the photographic education program at a large West Coast university visual arts department. The study investigated the connections between the individual, interpersonal, and institutional development in an artistic community that made use of improvisation as a resource for their teaching and practice on a daily basis. The study observed the different time cycles of development and change in the transformation of an autonomous unit within a fine arts department once known for its excellence in manual black-and-white photography into a program that cultivated skill with automated processing of color images with digital imaging and which cultivated the exploration of boundaries beyond the physical isolation of the darkroom and studios of photography. Changes observed over 2 years include: shifts in the status of individuals from beginner to expert within the domain of black-and-white photography and digital imaging; the transformation of interpersonal interactions within a community of undergraduate, graduate, and faculty darkroom users as an automated system for color printing and off-site commercial film developing replaced their community darkroom; and students and faculty made their first attempts to incorporate digital imaging into their curriculum and practices in response to pressures and inquiries about new technologies within and outside the program, the department, and the university, attempting to shape the future and relevance of their program while trying to preserve coherence in their identities as artists and scholars. Three levels of improvisation in teaching and learning are discussed: individual, interpersonal, and institutional. (Contains 33 references.) (Author/SWC)

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Learning What to See: Comparing Chemical Photographic and Digital Imaging Education

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Introduction

My contribution to the panel's focus on improvisation in education is derived from my ethnographic case study of stability and change in the photographic education program of a large West Coast university visual arts department. I spent two years as a participant observer of the connections between individual, interpersonal and institutional development in an artistic community, a community that made use of improvisation as a resource for their teaching and practice on a daily basis.

My challenge as an analyst was to observe the different time cycles of development and change at work in the transformation of an autonomous unit within a university fine arts department once known for its excellence in manual black and white photography, into a program that cultivated skill with automated processing of color images and with digital imaging and which cultivated the exploration of boundaries beyond the physical isolation of the darkroom and studios of photography.

The changes I observed and experienced in just a few years were substantial. They involved shifts in the status of individuals from beginner to expert within the domain of black and white photography and digital imaging; the transformation of interpersonal interactions within a community of darkroom users (undergraduates, graduate students and faculty members) as an automated system for color printing and off-site commercial film developing replaced their community darkroom. Another source of change was at the level of the program's place in a large institution. This group of undergraduate,

graduate student and faculty artists were making their first attempts to incorporate digital imaging into their curriculum and practices in response to pressures and inquiries about new technologies within and outside the program, the department and the university. They were reaching toward and trying to shape the future of and relevance of their program while trying to preserve coherence in their identities as artists and scholars.

Three levels of improvisation: Individual, interpersonal, institutional

Since I studied people engaged in teaching and learning in an art world, I encountered environments saturated with opportunities and crises that generated improvisation, whether I was watching one person work alone or whether I was observing teaching interactions. Novices grappled with the endless combinations and uses of darkness and light, time and chemicals. They learned the tricks and tolerances of photochemical materials in film developing and open bath printing. Students and teachers worked together in an old fashioned manual darkroom making test strips, (models of images in progress that were subjected to different amounts of light); using filters and different kinds of paper.

Beginners learned from their instructors and from each other to improvise on the spot when the standards and rules guiding their work were inadequate for situations that arose in the moment. Instructors were stimulated and inspired and sometimes

frustrated by their engagement with students who brought new ideas and perspectives with them into the studio. Undergraduates, graduate students and faculty members learned and worked together in shared spaces where mistakes and accidents affected everyone's work.

Masters of various techniques and schools of image making co-existed in the program, and whether they were interested in manual black and white; automated color or digital imaging work, these experts tried to improvise conditions that would continue to support learning and production as new techniques and image making modes and standards of practice were introduced into the curriculum.

Interpersonally, improvisation could be found as photography members of varying levels of skill negotiated any number of shared problem spaces while orienting to different goals. For example, graduate students were typically teaching photography as part of their service to the community and to earn a living as they pursed M.F.A. degrees. They tried to balance the onus upon them to produce fresh and experimental work as young artists with the requirements of the faculty that they instruct undergraduates in a basic approach to black and white photographic film development and printing--an approach that required students to use the same materials and processes and do the same technical assignments in the same order. This requirement was geared toward keeping the darkroom running smoothly and making sure that student work could be graded

according to a single standard It also helped make sure the darkroom and studios were kept in good repair for the use of people of multiple skill levels.

Undergraduates were trying to get as much experience of various kinds as possible; they made mistakes, they asked questions, they broke rules and they wanted more--more productive time in the darkroom, more efficient processes; more types of courses, and more freedom to experiment while they had the chance. Undergraduates were doing photography as only one dimension of their course work elsewhere in the department or in the larger university, while graduate students and faulty members had more of a stake in the plant and processes of the photography program, but were also connected to activities outside the program that generated competing goals and interests.

At the level of the institution, improvisation was at work where the people responsible for the growth and development of the program found themselves at a crossroads. Their program had run with the same faculty, materials and curricular structure for roughly 20 years. As they re-tooled the darkroom to accommodate color and automated processing and shortly thereafter expanded the curriculum to include digital imaging instruction, the people responsible for running the program had to negotiate a relationship to the mission and goals of their past; renegotiate their relationship to other faculty members and programs in the department, and deal with the demands of students and colleagues in the university to chart a new future that included more efficient processes and access to digital imaging.

Data and theory

I gathered a variety of ethnographic data on these processes of change, capturing processes that unfolded over minutes, weeks and months. Audio and videotaped interactions and interviews with faculty members, teaching assistants, and undergraduates working with black and white darkroom photography and digital image making formed, along with entries in my field notebooks and sample artifacts, the core of my evidence about these levels of change underway. I have brought some slides to show you to illustrate some of the things I will talk about today, and have included some transcripts on observation and interview data that illustrate he role of improvisation in the three levels of transformation I outlined above, in the individual experience of teaching and production; the interpersonal relationships that were formed through such experiences; and in the institutional demands for and constraints on change that people in the program struggled with.

Simultaneous acquisition and transformation of skill

Those of you familiar with Barbara Rogoff's (1994, 1995) work will recognize these categories as the levels of analysis that she uses to talk about transformation through practice. The notion of a multi-level approach to the study of interrelated

processes of change recurs in socio historical or cultural historical approaches to development, for example in the levels of operation, action, and activity in Yrjo Engestrom's (1987. 1989, 1991, 1990) developmental research on work and teams. In my study, the tools I used to make sense of the data included concepts developed in cultural-historical activity theory and ethnomethodological studies of membership. I engaged the former literature to explore patterns of change in interlocking systems, and relations between components of systems and points of view at particular moments in the program' s history.

I found ethnomethodology (Garfinkel, 1967, Leiter, 1980, Mehan and Woods, 1975, Button, 1991) useful for the way that such microsociolgical studies of the social order provide a framework for talking about the acquisition and display of the hallmarks of skill, and membership, and for the insight into stability and change in local norms at the level of face to face interactions in a community of practice.

Its always a challenge to bring diverse theoretical and methodological traditions to bear on ethnographic data, but where the topic is multiple levels of change, you need different lenses for adjusting the to depth of experience you document in the field. I locate the study as a multi method contribution to research on the acquisition and transmission of expertise, and to research on the emergence of new technologies, specifically on the effects of technological change on group work.

The theme of improvisation as a resource for development flows through each of these research programs, largely because moments of improvisation mark an intersection between the past and the future, the struggle over the definition of skill and the direction of development, and tensions between the given, an emerging problem space and changing desires. I am interested in working out the relationship between innovation, improvisation, development and transformation conceptually.

Mikhail Bakhtin observed, in his reflection on one of Tolstoy's essays that "Art begins where the tiny bit begins." (Morson and Emerson,. 1990.) Bakhtin was interested in the way that Tolstoy explicated the importance of minute and subtle changes in the texture of daily life, especially between one phase and another of a single artistic work. These subtle changes make all the difference in the world to the artist and to those guiding her development, as a thing of art comes closer to the point when one looks at it and says 'one stroke of the brush more and that's ' or 'one second more of light and that's it'. Bakhtin speaks to the value of appreciating changes in mundane experience as a way to build up a picture of borders and boundaries between one phase in the life of a person, an interaction, or an institution and that which succeeds it. I associate this point also with Raymond Williams'(1960, 1980) studies of culture and the changes in the conditions of a practice, especially his notion of changes in the "structure of feeling" .

In his (1960) novel *Border Country*, Williams chronicled the changes in Welsh village life, as the ethos and material base of the industrial era seeped into the tiniest corners of Welsh experience. A story told through the eyes of a man returning to the village of his youth after training for a medical career in the city. Both Williams and Bakhtin appreciated the impact of small changes in daily life and in mediational means guiding human communicative activity and production. Both saw these incremental changes in the texture of life not as cumulative but as transfomative of consciousness.

One of the things I was interested in my study was a comparison of changes in the perspective and consciousness of teaching and art related goals and experiences that individuals underwent as they learned about all of the possible mean to their ends in producing innovative work. Whether this meant moving from the status of artists responsible for expressing their own vision to guiding novices through basic operations, or dealing with a new platform for image making--what sorts of improvisation arose when individuals versed in one mode of photographic practice became novices anew in their first engagements with another domain?

My study revealed countless situations where norms and conventions fell short as guides to practice, both within one mode of image making as taught and learned, and between modes of image making brought into conversation with each other. In the tensions between what was useful for the artist and what was useful for the student or the

teacher, I saw that rules supporting learning in one situation were sources of conflict in another.

I alternately saw improvisation as the symptom and the meta-comment that bubbled up from these pools of individual, interpersonal and institutional foment. Beginning photography students simultaneously learned the rules they were expected to follow and saw shortcuts and exceptions known to the experts revealed everywhere around them. Black and white and color photography and digital imaging teachers improvised ways to be responsible to students while they were trying to get time alone to work on their own goals. A digital imaging artist improvised with existing resources institutional resources to make it easier for the institution to adopt his personal goals as its own.

I found improvisation in the smallest places, just as Bakhtin did, in what he described as small messy worlds within worlds, with the openings as fissures seeping inward into themselves and bubbling outward toward futures. This "movement" and "bubbling", Bakhtin called *unfinalizability.*(Morson, Ermerson, 1960, p. 36).

This notion of unfinalizbility speaks to the central contribution of my larger study of the photographic education program to the discussion of improvisation. Expertise, no matter from what level you consider it, is a moving target, distributed and enacted between people and the environments and materials they find at hand. Improvisation is related to the constant renewal of skill and expertise in that improvisation tension at the

intersection of conventions or rules; their necessary unfinalzability, and the emergence of a "next turn" in creative work.

I was fortunate to have been able to see such obvious examples of and evidence for expertise as a moving target, as a negotiated, contingent renegotiation of what counted as knowledge and skill between people and goals rather than as a stable thing or an inventory of finite pieces that could be accumulated. I studied a setting wherein ideas about the acquisition of skill and the transformation of what was valued in the community generated conflict, the contradictions in the system were thrown up to the surface of people's consciousness. Let's start into my data with an example from a relatively stable point in the institutional history of the program, at the level of an individual teacher modeling improvisation and circumstances of adherence to and departure from the rules; an example that shows how undergraduate beginners in chemical photography were instructed about procedures for darkroom work in their classroom lectures, and how their teaching assistants helped students obtain desired results under time pressures in ways that departed from these norms. .

In this example from black and white printing, a student, Sergio asks a teaching assistant Xiao about enhancing the effect of a given time interval for exposure of photographic paper to light by "dodging" a portion of the image. Dodging refers to selectively withholding light from one area of photosensitive paper while exposing the rest of the print surface to light. Other students are gathered around the pair as Xiao looks at

Sergio's work:

Sergio: See the light on the shirt with shadows? Can I use this exposure time and dodge the head?

Xiao: No you can't. On the midterm I recall, the student last quarter who was asked a question. The person said meter off the ground, he neglects what kind of person the subject is, what the skin tone needs. Of course, if it is different, its a large consideration. Maybe here, you still get a strong sense of light with three and a half, with higher contrast. The exposure time should be increased.

Sergio: (*under his breath to another student*) Do you know how to do this?

Xiao (continues)... it might be three and a half. Do another test strip. You will find it is already too dark. This is undried paper, it will dry darker. Your body temperature is higher than that of the chemicals. Use your fingers to force the detail out of the paper. Do it after the developer but before the fix. Soak your finger in it.

Sergio: That's cool. I haven't done this before.

Here, the teaching assistant Xiao seems to take Sergio's question as an occasion to start a conversation about the need to make test strips of images and not to guess about likely outcomes or correct exposures. Xiao is doing some interesting improvisation here. He is presented with an imperfect student image that generates a question-- how to solve the problem of a technically correct exposure time that has produced a print wherein the head in a photograph is too dark. Xiao launches into a discourse about materials and judgements that the student should be thinking about. Xiao takes the student (and the rest of the class) back to the issue of exposure when shooting film (metering properly), and suggests that the problems with paper printing originated with the film exposure. Xiao's reference to another student and a midterm examination question points to the broader theme in photographic education of subtle technical constraints and the number of judgements that must be considered at each step along the way. Further, Xiao points toward the future of this printing problem, by noting that the paper will dry darker and that it is already too dark as a wet print. Just when it seems that he is drilling the discouraged student into the ground with all the ways that this print was technically wrong, was wrong from the start and will be wrong when it dries, Xiao ends his critique by sharing a secret trick-- using the developing chemical and one's own body heat as a substitute for light to enhance the chemical reaction . Xiao improvises a bridge between his experience as a skilled artist and the requirements

upon him as a teacher to correct the student's work, generating an account that is part critical assessment and part shortcut solution to the student's problem

The 'Eyes of genre' and photographic vision

I have entitled my inquiry into the possibilities for and conditions of improvisation in photographic education "learning what to see". Thinking about black and white darkroom practices suggested in the above data excerpt and looking toward improvisational forms that arise in the digital imaging lab, I want to talk address the issue that before students and instructors come together to work in these venues on what to see, what to pay attention to, what to strive for, these activities are anchored in and informed by notions of *how* to see. Pavel Medvedev 's contribution to Mikhail Bakhtin's theories of genre included Medvedev's work on the notion of 'the eyes of genre' --a useful concept for exploring the socio-cultural evolution of particular orientations to vision, and how adherence to and departure from conventions is the rhythm of the engine of creativity.

Many people interested in improvisation note that while improvisation builds on rules, the dust and smoke kicked up by the work of the builders obscures for a time the base upon which their assumptions rest. In my larger study, (Brown, 1996) I elaborate a notion of photographic vision as, " a complex of technologies of perception with perception as a cultural historical accomplishment that arises through artifact

mediated activities of communication and definition". I reached this formulation through my readings of the late Marx Wartosfsy's (1979)
work on models and representations and through Charles Goodwin's work, (1993, 1994) and Charles and Marjorie Harness Goodwin's work on 'Professional vision' (1992). The Goodwins explore professional vision as a perspective generated by the tools and talk that professional people use to turn raw materials into work relevant objects of vision.

The "eyes of genre" for Medvedev develop culturally, as a specific way of visualizing a given part of reality (Morson, Emerson p. 275). Medvedev notes that "seeing is shaped by genres of expression...where seeing and representation merge...new means of representation lead to an ability to see new aspects of visual reality (IBID p. 276). To see with the eyes of a genre does not preclude the possibility for exploiting the potential for the new. In fact it is through this formulation that we can understand that the assumptions and conventions that help build up generic forms are also in movement as growing dimensions of culture.

But aren't there blinders around the eyes of genre for some of us? What makes the difference between being disposed toward exploiting the potential for the new and resisting change? In the next excerpt, Gill, a photography teaching assistant is responding to questions about the major changes in the organization of the productive space and the curriculum in the program. He views the coming changes with mixed

feelings. In his voice is both the skepticism of a teaching assistant accustomed to teaching and working with students in manual black and white techniques, and the voice of an individual artist familiar with the automatic processor that will soon be implemented for group instruction.

KB: How do you think that, the shift in the curriculum..are you going to be gone by the time that the shift in the curriculum happens?

Gill: : When it goes to digital?

KB: Up hmm, but first when they start with color, when VA, when VA 60 goes--

Gill --I'm gonna be around for that.

KB: Yeah? And do you have any sense of how that is supposed to go?

Gill : Well, its supposed to be up a shift to a machine style of printing. Because I've done that, its not so shocking to me, but apparently, beginning students will be printing color, and also printing black and white RC prints. Everything will go through a machine, they'll never touch a tray, until the uh intermediate kind of work. Its not such a shift, I mean, they're

still going to be burning and dodging, and just doing basic things like that, Although color printing has its own set of technical maneuvers. And in some ways its harder to teach. just because getting color balance right is a real finessing kind of thing, I mean the greyscale is a little easier to manipulate. Color... color shifts are just hard to deal with. You have to deal with one shift at a time, isolate one, and actually have an eye to determine what the problem is, so if you have a cast of like, purple, purple could be made up of a number of colors that you have to adjust for, and so trying to relay that information to students, its like, (tone of voice upward) 'well, this could be blue, this could be magenta, this could be a little bit of yellow', and they

have to individually first get the blue, then the magenta then see if it needs yellow, and whatever...Instructing that kind of patience and observation is going to be more difficult than black and white.

Gill displays his intimate knowledge of color balancing, and trouble shooting skills required for working in color as a matter of contrasting what a person needs to

know with what undergraduate instruction as organized in the black and white darkroom could support. His contrast of the ease of instructing students in black and white versus instructing them in color techniques turns on references to patience, observation, finessing, (needed to improvise in response to the ambiguities of color processes) vs. the presumed ease and uniformity of manipulating the gray scale (leading to standardization in black and white work).

We already saw in the earlier data sample that the simplest operations in black and white work require improvisation and there are exceptions to rules at every level. Yet Gill's account is reflexive to his experience as a member of a group of teachers who taught a standardized method, and to his unease as a program member looking at the changes ahead with some anxiety about the division of labor. He sees an order of complexity in color work that will strain the resources of the teachers and the community members.

KB: It's going to change the number of students that can be taught, do you think?

Gill I think its gonna change the number of students who are effectively taught and who can transcend the frustration level that's inherent in learning that, that's going to be a real test of their patience, and the

acceleration of teaching a ten week quarter, teaching something like color, and enabling them to make a technically good print in that time is going to be...a real challenge. I can see that its going to be very difficult. I think that teaching somebody how to rock a tray back and forth can be accomplished in two or three weeks, to learn value and contrast, but to learn color balance and cast, and that kind of thing, is going to be a real challenge to people who ta in the future.....

(...)

And uh, that's going to be the interesting part for me because of the level of maintenance and supervision that goes on here. I mean, who's going to make sure that the chemistry is topped off every day, that the rollers are clean and that its operating at the proper temperature? And that if a print gets jammed inside, that somebody knows how to get the print out of the rollers, and all that kind of stuff. I can't imagine the students adequately being able to function at that level of competence in the kind of demonstrations that they'll get...I can imagine them just

beating the machine up and it'll break down, and that there will be difficulties with it. Just having worked with machines, and knowing what they do, and the ways, the dysfunctional ways that they work, uh, I know that if you feed a print in, it can get lost. And if you feed a print in it can get lost and you think (voice tone rises again) 'well, maybe I didn't put a print in' and you put another print in and if you have a number of students waiting for this thing and start feeding pieces of paper in it, nothing will come out. And finally at the end of eight minutes or ten minutes, somebody will realize that a print is jammed in the machine and they'll have to take the cover off and they'll discover all these prints wrapped around the plastic tube rollers that are inside, and they're going to have to disengage the machine and take these rollers out, pull the prints out or cut them off of the rollers. And who's going to have the skill to do that? Whose going to have the level of competence to do that? Will there be an advanced student around who actually knows that machine well enough to do that and how will this happen? I find all of

these things perhaps not very well anticipated and problematic if they don't have a full time lab tech working. It seems like a really ballsy thing to do to put that machine out there and expect it to work all the time, Well. So, I think that the reliance on the technology and the trust in the technology may not be rewarded with great results at first till they find a way to smooth things out.

Gill's way of visualizing one given part of reality--the division of labor, the level of supervision, and the openness of the community in the present, is at odds with his way of visualizing the requirements imposed on users with color work on a print processor. His reticence about the future is tied to what he sees as a mismatch between existing teaching practices that can handle whatever comes up in black and white work and the exponential increase in variables and decrease in the tolerances that he knows about from his own work with automated processors.

Jim Wertsch's (1994) explication of relationships between mental processes and settings in which they occur is useful here when we think about the tools and signs that mediate representation and improvisation in photographic work in the old configuration of black and white work, and the shift to automatic processing and color.

The old darkroom was full of the types of artifacts, signs and arrangements that Wertsch points to as embodiments of sociocultural patterns of work and knowledge about how to function in the community. We are invited, by Gill, to look both ways at a crossroads in the program. From his vantage point, new mediational means (color work, automated processing) are not well anticipated or suited to the way things work in this particular community setting. There were, at the time I interviewed Gill, no plans for changing the division of labor or conditions of instruction and supervision. Ultimately, Gill's worries that plunking down an automated processor would problems, were borne out for a time, before the community developed new versions of the layers of mediational means and understandings by users that were developed over the course of 20 years of printing in the black and white darkroom.

At the heart of Gill's concern was that the artifactual, interpersonal and conventional base from which appropriate improvisation could arise did not exist in the faculty's plans for the color processing lab. The history of the manual darkroom as an instructional space, and the kinds of interaction and trouble shooting that the discreet processes used in that mode of work were taken for granted, but not externalized, reflected upon, and valued as things to be deliberately carried over to the next phase.

Just at Wertsch locates tension "between mediational means and their unique instantiations" Gill felt the tension between color film and processing equipment as used by an experienced artist and its limits as a hardy or intuitive teaching tool. Gill also must have realized that if the students would not be learning how to develop their own film, (sending it out instead to commercial developers) that students would not have much experience with figuring out the relationship between time, light and chemistry before they started using automatic processors, and would have that much less experience to draw upon. This particular situated use of such a machine, Gill found, was mismatched to the known level of community responsibility and proficiency.

Zones of Proximal Development

A zone of proximal development was classically defined by L. S. Vygotsky (1978), as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined by problem solving under adult guidance or in collaboration with more capable peers." (1978 p. 86). As one of the more famous concepts of cultural-historical psychology, zoped emphasizes the fruitfulness of joint problem solving. In my research on a group of arts educators and students, the concept was extended to individual, interpersonal and institutional levels to study the dynamics of acquisition and transmission of practice, and the transformation of practices.

The sorts of improvisation that occurred within zones of proximal development took place in a setting where experienced and inexperienced practitioners were adopting and implementing new image making techniques and processes independently, and as a group, that affected both the organization and the content of their work.

Engeström (1989), describes what is possible in zones of proximal development as a type of learning that : "cannot be measured by the acquisition of pre-existing well defined skills and knowledge; not even by individual ability to participate fully in the community of practitioners." He finds this where "a community hesitates and does not know what should be learned because it is facing an uncertain and contradictory field of demands and possibilities."

This expansive form of learning in the zone of proximal development involves the simultaneous creation and acquisition of the object and instruments to be learned (Engeström, 1990, p. 115.). This characterizes the situation I encountered looking at the way the photography instructors were moving toward color processing conversion. But it really speaks to what was going on as the community expanded again at another level to deal with the advent of digital imaging technology.

With digital imaging thrown in the mix, suddenly the contrasts between black and white and color processes paled. With black and white and color photography, you essentially have a film and chemistry base where processes more or less moved toward

a finished paper positive from a film negative. In digital imaging, there is a scanner or an image capturing device, that allows you to replace time and space sensitive processes of light and chemistry with captured electrons. The differences between photographic and electronic processes is a paper in itself. But my concern here is in talking about the levels at which people in the program improvised in order to incorporate digital imaging into their "film and chemical" world.

Michael Cole (1990), has said of zones of proximal development (zopeds) that they are places where culture and cognition create each other. I found such zones arising at moments and in places in the photography program where a person's reach exceeded his or her grasp, and where individuals and groups were led forward to discover new objects and possibilities through interacting with more experienced people who brought different material and conceptual tools to bear in a shared problem space.

This was certainly true as the people in the program looked at how digital imaging would figure into their futures individually, interpersonally and institutionally.

Improvisation at the institutional level: Reaching for the future.

What follows is an excerpt from an interview with Chad, a digital imaging artist who had been trained as an undergraduate in the black and white program and who had returned to teach photography courses as a part time instructor after receiving his

M.F.A. at another institution where he learned digital imaging. He was the person who brought "the news" about digital imaging technology and digital photography to the attention of the program faculty

> **Chad:** When I originally arrived back here after leaving (city) we came back to (city), and at that point, nobody was talking about digital imaging in the department period, I mean it just wasn't happening.
>
> **KB:** And this was when?
>
> Chad: That was in the Spring of 1991, and nobody was talking about digital imaging, and so I started digging, and found that there were already several labs on campus that would be available for undergraduate teaching purposes. And it was just a matter of digging deep enough and finding the right people to ask and so that, up I, so that at that point I proposed a course through extension so that I could get a chance to work on the actual nuts and bolts of the actual instruction portion of the curriculum then, uh, I found a couple of different labs on campus that were completely adequate, that were set up with SG's (*Silicon Graphics machines*).
>
> And that's typically the case, that the computers will be there but that its a matter of the artist going out

and finding them and asking to use them, so at that point, when you don't really...right now, uh, (the University) would need, uh, they wouldn't really need to acquire any hardware to be teaching digital imaging as a regular course in their curriculum.

Chad opened his narrative about bringing digital imaging to the consciousness of faculty members by talking about the exploration of the institutional situation at the University, and his personal interests in developing and proposing digital imaging at a time when "no one was talking about it". He pushed boundaries at the institutional level to reallocate existing University resources to support instruction in digital art. Put another way, he improvised within the given structure of resources to achieve a new route for access to computers for art students, to help them learn digital imaging, as part of his own goal of -working out the nuts and bolts of a digital imaging curriculum.

I conducted an interview in May of 1994 with Ernie, an M.F.A. student in the program who was exploring digital imaging in his own work while employed as a t.a. in the black and white darkroom photography course. .

KB: Tell me what you think about the so called death of photography.

Ernie: All that stuff about the truth, veracity of the image and all that... The storage has changed, but big deal, it is still photographic to me to the extent that it goes through a lens. Its not any more postmodern than that the technology has moved to this point... ...But , yes, there is this wonderful romantic aspect of the habits and your practices. Well I guess you can be irradiated by the computer in your office as well as poisoned in the darkroom. (ha) But, yeah, you're right, there is no tactile sense of the regular darkroom in the digital darkroom. I have a great attachment to materials, I like to sample surfaces. I like the qualities. I have the working knowledge base, all the control and mastery stuff, yeah. But the toxicity, I like to with the least toxic set of tools, and just forget them the act of making the photograph. Seeing images come up in the developer, I like the speed of it, the whole birth thing. To

contrast it with computer stuff, well you , start with the image there, you manipulate what is captured. That goes away. Now instead of making several prints in the darkroom, in the computer, you cut and paste with ease. Time is a factor in this. You're not going through the manual forms of production, That magic is gone.

KB: How is this "postmodern" ?

Ernie: Digital capturing is changing the relationship, if you're capturing it in a digital form. Like, with celluloid forms the latent image is there. There is the aesthetic, romantic feel of the materials. I dunno bout efficiency....Its a change in the object. The computer opens the doors to free play with other things. The computer allows you to handle images differently with different consequences.

Ernie compares and contrasts aspects of analog and digital image making--capture, efficiency etc. in different configurations of equipment use and manufacture, the human touch in art, relationships to materials, and the historical

context of the postmodern /modern conversation about photography and painting, and the state of the art in digital output. He is clearly well versed in the critical and technical discourse surrounding the emergence of digital imaging. Interestingly, he uses the phrase "a change in the object" here, referring to the changing conditions that allow artists view new consequences for their work.

Yrjo Engestrom notes that the life of an activity system is marked by rythyms and discontinuities. If we think of the photography program as a collection of spacially and temporally distributed activity system, we see both the persistence of their formations, and the spaces where creative tensions produce novelty. It seems, for example, that once they opened the door to digital imaging in their individual and collective toolkits, the members of the photography program really had to begin improvising their future at a higher level than when the developments were contained within the genre of film based work. Individually and collectively, people associated with the program had to "reconceptualize and plan the objects and products and thereby the organizational forms of their work on an ongoing basis" Engestrom (1989 p. 83).

Keith Sawyer (1995) says about improvisational interaction that all social interactions display improvisational elements. He also explores how the meaning or significance and structure of improvisation is generated within specific social contexts.

What I have tried to suggest here is that the contemporary sociocultural and cultural historical theory offers tools for exploring the organization of improvisation at multiple levels. We have, then, an opportunity to understand Gill's mixed feelings in reflecting on the levels of personal, interpersonal and institutional consequence and meaning of improvisation among beginners and experts working together in an old fashioned darkroom; the introducing of color processing into the photography program; and the advent of digital imaging in the curriculum of an institution.

Sawyer's observation that performers are constrained to act within a performance genre lines up with Bakhtinian notion of the 'eyes of genre'. We can only hope that the members of the photography program persist in their ability to exploit the potential for the new through widened involvement with others whose vision and goals overlap and extends theirs.

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